

SUPPORT FOR THE AMENDMENTS

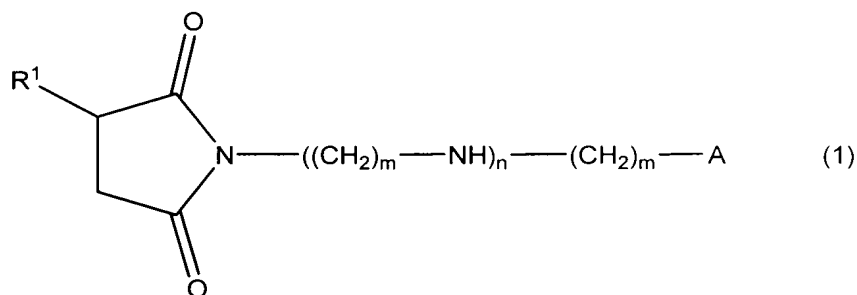
The present amendment cancels claims 2 and 13, amends claims 1 and 6, and adds new claims 16-22. Support for these amendments is provided by the originally filed claims and specification. Support for the amendments to claims 1 and 6, as well as newly added claims 16-22, can be found, for example, at paragraphs [0011]-[0014], [0022], [0034]-[0037] (hexadecenyl (C<sub>16</sub>) succinic anhydride), [0038]-[0039] (octadecenyl (C<sub>18</sub>) succinic anhydride), as well as now cancelled claims 2 and 13, of Koshima (U.S. 2006/0160709), which is the U.S. pre-grant publication of the originally filed application. It is believed that these amendments have not resulted in the introduction of new matter.

### REMARKS

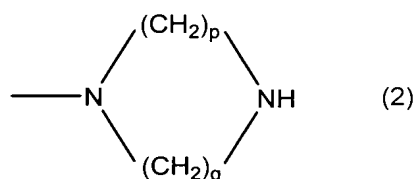
Claims 1, 3, 6, 11, 12 and 15-22 are currently pending in the present application. Claims 2 and 13 have been cancelled, claims 1 and 6 have been amended, and new claims 16-22 have been added, by the present amendment.

The rejections under 35 U.S.C. § 103(a) of: (1) claims 1-3, 6, 11 and 12 as being obvious over Meyer (U.S. Patent 4,863,487) in view of Harrison (U.S. 2004/0102338); (2) claim 15 as being obvious over Meyer in view of Harrison and Ohtani (U.S. Patent 5,441,656); and (3) claims 1-3, 6, 11-13 and 15 as being obvious over Tiffany (U.S. Patent 5,789,356) in view of Meyer, are obviated by amendment, with respect to claims 1, 3, 6, 11, 12 and 15-22, which incorporates into amended claim 1 the limitation of now cancelled claim 13 (thereby obviating the obviousness rejections of items (1) and (2) above), and the limitation that the succinic acid or the anhydride thereof is substituted with a linear alkenyl or alkyl group having 16-30 carbon atoms, and wherein  $R^1$  represents a linear alkenyl group having 16-30 carbon atoms or a linear alkyl group having 16-30 carbon atoms (thereby obviating the obviousness rejection of item (3) above).

Amended claim 1 is now directed to a lubricant composition comprising: a succinimide compound or a boronization product thereof (A), wherein the succinimide compound (A) is represented by the following general formula (1) and is obtained by reacting (a) a succinic acid substituted with a linear alkenyl or alkyl group having *16-30 carbon atoms* or an anhydride thereof with (b) a polyalkylenepolyamine comprising 5-100 mole % of a polyalkylenepolyamine having a ring structure at an end, based on an entire amount of the polyalkylenepolyamine (b):



wherein  $R^1$  represents a linear alkenyl group having *16-30 carbon atoms* or a linear alkyl group having *16-30 carbon atoms*, m represents an integer of 2 to 4, n represents an integer of 0 to 3, and A represents the ring structure in the polyalkylenepolyamine having a ring structure at an end or a mixed structure comprising the ring structure and an amino group, wherein the ring structure A in the polyalkylenepolyamine having a ring structure at an end is a *ring structure represented by the following general formula (2)*:



wherein p and q each independently represent an integer of 2 to 4; and a succinimide compound or a boronization product thereof (B) having a number-average molecular weight of 500 to 5,000 and is substituted with an alkenyl or alkyl group, wherein the succinimide compound or the boronization product thereof (B) is present in the lubricant composition in an amount of *10-1,000 wt. %*, based on 100 wt. % of the succinimide compound or the boronization product thereof (A), and wherein the lubricant composition is for an automatic transmission.

Tiffany describes a functional fluid composition for imparting improved detergency and lessened toxicity to a water-cooled two-cycle engine oil composition, wherein the functional fluid composition comprises: a lubricating oil; and a synergistic combination of: (I) an acylated nitrogen-containing compound; and (II) an ashless detergent (See e.g., column 1, lines 35-61). An example of the acylated nitrogen-containing compound (I) includes a succinimide compound substituted with a  $C_{20}$ - $C_{60}$ , preferably a  $C_{25}$ - $C_{40}$ , and more preferably a  $C_{30}$ - $C_{35}$ , olefinic hydrocarbyl group (See e.g., column 2, lines 3-11, column 5, lines 46-62). An example of the ashless detergent (II) includes a succinimide compound substituted with a  $C_{60}$ - $C_{350}$ , preferably a  $C_{70}$ - $C_{128}$ , hydrocarbyl group (See e.g., column 8, lines 58-67, column 9, lines 1-17).

Meyer describes a detergent for a hydrocarbon fuel composition comprising an alkenyl substituted succinimide compound prepared by reacting an alkenyl substituted succinic acid or anhydride thereof with a mixture of aliphatic and heterocyclic amines, wherein at least 90 wt. % of the alkenyl substituent is derived from a mixture of C<sub>10</sub>-C<sub>30</sub> olefins (See e.g., abstract, Tables I, V and VI-IX, claim 1). An example of the heterocyclic amine includes hydroxyethylpiperazine.

A skilled artisan would neither have been motivated nor had a reasonable expectation of success to modify the synergistic combination of succinimide compounds described in Tiffany with the fundamentally different succinimide compound of Meyer, which is prepared by reacting a mixture of aliphatic and heterocyclic amines with succinic acid or anhydride thereof having an alkenyl substituent derived from a mixture of C<sub>10</sub>-C<sub>30</sub> olefins, to arrive at the lubricant composition of the present invention having a ring structure at the end of the polyalkylenepolyamine as presently claimed, absent impermissible hindsight reconstruction, thereby precluding a *prima facie* case of obviousness.

Tiffany describes that the functional fluid composition described therein imparts *improved detergency and lessened toxicity* to a water-cooled two-cycle engine oil composition as a result of the *synergistic combination* of (I) a succinimide compound substituted with a C<sub>20</sub>-C<sub>60</sub> olefinic hydrocarbyl group and (II) a succinimide compound substituted with a C<sub>60</sub>-C<sub>350</sub> hydrocarbyl group.

Why would a skilled artisan be motivated to modify the synergistic combination of succinimide compounds described in Tiffany, which already imparts improved detergency and lessened toxicity, with the *fundamentally different* succinimide compound of Meyer, which has a heterocyclic ring structure at the end of the amine described therein?

Unlike the functional fluid composition of Tiffany, which imparts improved detergency and lessened toxicity to a water-cooled two-cycle *engine oil composition*, and the detergent additive for a hydrocarbon *fuel composition* of Meyer, the lubricant composition of the present invention imparts a long lasting anti-shudder property to an *automatic transmission* without impairing

transmission torque capacity and the friction coefficient between metals as discussed in the present specification (See e.g., abstract and paragraphs [0001]-[0010] of Koshima (U.S. 2006/0160709), which is the U.S. pre-grant publication of the originally filed application.

Applicants respectfully submit that a skilled artisan would immediately recognize that the lubricant composition for use in an *automatic transmission* in accordance with an exemplary aspect of the present invention is *fundamentally different* from the functional fluid composition of Tiffany and the detergent of Meyer for use as a *fuel additive for an engine*.

As discussed in the present specification, when the number of carbon atoms in the alkenyl group or the alkyl group of the succinic acid or anhydride thereof (a) is *greater than 30 carbon atoms*, the succinimide compound or the boronization product thereof (A) is *not sufficiently dissolved* into the base oil of the lubricant, whereby a long lasting anti-shudder property *cannot* be obtained in the automatic transmission (See e.g., [0012] of Koshima).

Unlike the lubricant composition of the present invention, wherein R<sup>1</sup> of the succinimide compound or the boronization product thereof (A) of formula (1) represents a linear alkenyl group having 16-30 carbon atoms or a linear alkyl group having 16-30 carbon atoms, as presently claimed, the functional fluid composition of Tiffany comprises a synergistic combination of (I) a succinimide compound substituted with a C<sub>20</sub>-C<sub>60</sub> olefinic hydrocarbyl group and (II) a succinimide compound substituted with a C<sub>60</sub>-C<sub>350</sub> hydrocarbyl group, which is *clearly outside* the claimed range of *only 16-30 carbon atoms*.

Applicants respectfully submit that the succinimide compound substituted with a C<sub>60</sub>-C<sub>350</sub> hydrocarbyl group of Tiffany is necessarily excluded from the succinimide compound or the boronization product thereof (A) of formula (1) of the present invention by virtue of R<sup>1</sup> representing a linear alkenyl group having 16-30 carbon atoms or a linear alkyl group having 16-30 carbon atoms, as presently claimed.

A skilled artisan would neither have been motivated nor had a reasonable expectation of success to remove the *requisite* succinimide compound substituted with a C<sub>60</sub>-C<sub>350</sub> hydrocarbyl group from the functional fluid composition of Tiffany to arrive at the lubricant composition of the present invention, absent impermissible hindsight reconstruction, since the succinimide compound substituted with a C<sub>60</sub>-C<sub>350</sub> hydrocarbyl group of Tiffany is a *necessary* component for imparting a *synergistically* improved detergency and lessened toxicity to a water-cooled two-cycle engine oil composition as discussed in Tiffany, thereby precluding a prima facie case of obviousness.

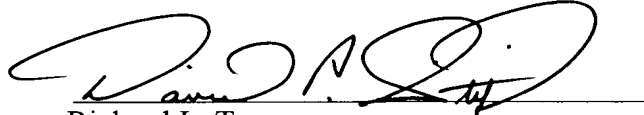
Withdrawal of these grounds of rejection is respectfully requested.

The objection of claim 6 is obviated by amendment. Withdrawal of this ground of objection is respectfully requested.

In conclusion, Applicants submit that the present application is now in condition for allowance and notification to this effect is earnestly solicited.

Respectfully submitted,

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